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East Europe Report

SCIENTIFIC AFFAIRS

No. 707

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BRIEFS

COMPUTER DELIVERIES--During 1981-1985, Czechoslovakia will import Soviet computers worth 200 million rubles, while its own computer exports to the USSR will reach almost 400 million rubles. The computer exports from the CSSR will be delivered by Zbrojovka Brno, Aritma Prague, ZPA Kosire, ZPA Novy Brod and other enterprises. A contract for delivery of peripheral computer equipment worth Kcs 700 million for assembly of Soviet computers was signed at the Brno Fair in 1980. The Soviets will begin delivery of the EC 1945 computers to Czechoslovakia in 1981, having so far delivered 150 EC 1033 computers there. [Prague VYBER INFORMACI in Czech No 1, 1981 p 54]

CSO: 2402/67

FUTURE SCIENTIFIC TASKS DISCUSSED

AU211140 Tirana ZERI I POPULLIT in Albanian 16 May 81 p 3

[Article by Prof Kole Popa, vice-president of the Academy of Sciences of the People's Socialist Republic of Albania: "The Natural and Technical Sciences in the Service of Resolving Production Tasks"]

[Excerpts] The natural and technical sciences have by now considerably extended the field of their activity and are increasingly raising their contribution in resolving tasks pertaining to production and the country's entire economy.

The eighth AWP Central Committee Plenum, an event of particular importance for the country's scientific, technical, economic and cultural life--with the tasks set out to raise the standard of research and scientific work and its effectiveness--opens up an important stage in developing our country's science and technology.

Taking all this into consideration, as well as the current stage of the country's general development and the tasks arising from the seventh 5-year plan, which is the first plan that has been drafted and will be implemented completely by our own efforts and in the conditions of total economic independence, the natural and technical sciences are confronted with important tasks pertaining to their further enlargement, development and deepening. We are thus confronted with the task of introducing mathematical thinking in all institutions and all production and research processes and cadres. The complexity of the problems requiring solutions makes it more than ever necessary to make the fullest possible use of electronic equipment from pocket calculators and desk microprocessors up to intelligent terminals (terminalet inteligsente) and the large computer (ordinator) of the Mathematical Computer Center. The time has arrived to unhesitatingly set up our national network of computer equipment. Further and more rapid development in the field of nuclear physics is also necessary, mainly in the field of neutron physics, in the field of laser rays and in setting up an experimental nuclear reactor to carry out preliminary studies pertaining to problems that will confront the power sector in the future and in our country's conditions. In the field of chemistry and production technology we are confronted with the task of raising the level of applied research processes in an organized way, concentrating the work in specialist institutions for technological design, to make certain that what we are building by our own efforts will be up to the standards of contemporary science and technology and fully meet the requirements of the seventh 5-year plan. The intensive study of biological and genetic processes is also an imperative for modernizing agriculture and its increased production.

CSO: 2102/4

BRIEFS

CONSUMPTION OF PHARMACEUTICALS INCREASES--Between 1976 and 1979, consumption of pharmaceuticals in the CSSR increased 9.5 percent, of this 6.8 percent in the CSR and 16.2 percent in the SSR. Most of the increase occurred in dermatological and gynecological preparations and in psychopharmaceuticals. [Prague CASOPIS LEKARU CESKYCH in Czech No 18, 16 Mar 81 p 559]

CSO: 2402/66

UDC: 681.2:519.252:532.51.08

INTELLIGENT DATA COLLECTING AND PROCESSING EQUIPMENT FOR FLOW MEASUREMENT

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 2, 1981 pp 46-50
manuscript received 27 Mar 80

FOCK, Karoly, and CSUBAK, Tibor (Department of Process Control, BME [Budapest Technical University])

[Abstract] A digital signal-processing family--called MICROCOR--was developed for measuring the rate of flow in closed and variously profiled channels and for making any corrections required in a continuous manner. Type M-8001 has a fixed program, meaning that the user must specify the parameters on the basis of which the newly generated processing program goes into the EPROM memory, while the RAM memory stores only the measured and calculated values. The most important parameter for the user, the integrated quantity, appears on an electromechanical counter. Type MC-80 is more universal since it can be freely programmed. By stating a command word, the user can select the measuring mode from among 24 options. Then the unit selects the parameters required for the selected mode of measurement, which appear when the "Auto" button is operated, permitting the entry of the parameter value from the keyboard. The program checks the parameters before entry. Either type can accept 16 two-wire telemetric analog signals or 8 frequency-output telemetric signals. It converts the measured values into physical dimensions, checks the credibility of the measured values, monitors and indicates exceeding of limit values, and--in case of gas-flow measurement--continuously corrects the expansion and compressibility factors. It calculates and displays the momentary flow rate and the integrated value of the flow. Optionally, the MC-80 performs digital time measurement and display, prepares an operating log, and offers data teletransmission option. Either unit has four channels, meaning that it can perform the measurement of four independent variables. The major components include the I 8080 A microprocessor, a 2 kbyte RAM and 4 kbyte EPROM memory, card adapter, analog-to-digital converter, analog multiplexer, and frequency-output telemeter interface. An optional general periphery module provides adaptation to thermal printer, modem, teletypewriter, and other units. The M-8001 unit is used with success at the sewer system of Budapest. Figures 4, references: 4 Western.

2542
CSO: 2502/76

UDC: 519.68

MICROPROGRAMMING AID SYSTEM

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 2, 1981 pp 62-65
manuscript received 20 Nov 78

HOKE, Sandor, DALOS, Mihaly, ENDRODY, Tamas, and PATAKI, Istvan, Computer-Technology Coordination Institute

[Abstract] To assist in the writing of the extensive microprogram for a minicomputer being developed at the Hardware System-Engineering Laboratory of the Computer-Technology Coordination Institute--representing approximately 300,000 lines of program--an aid system called the MITOS (MIcroprogramming TOols System) was developed. It runs on an IBM 370/125 computer, and consists of three major parts: the basic programs running on the IBM computer in a batch environment; the ETTS time-sharing system; and the PROFESSZOR (program development aid and service system) combining the former two and making the system into an amalgamated entity and program packet. The basic programs include the microassemblers, the microeditor, the diskette writer, the BP simulator, and auxiliary programs. The system, which operates satisfactorily in practice, is used by approximately 40 programmers, who are greatly assisted by the displays, programming-accelerating software, and program-developing capability. The data bank in the MITOS provides adequate data security. Figures 2, table 1, reference: 1 Western.

2542
CSO: 2502/76

UDC: 681.327.2.001.4

EXAMINATION OF MNOS MEMORY DEVICES ON THE BASIS OF CHARGE-STORAGE CAPACITY

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 2, 1981 pp 51-55 manuscript received 28 May 79

SZABO, Robert, LANC, Jozsef, and Dr EPPELDAUER, Gyorgy, Central Physics Research Institute, MTA [Hungarian Academy of Sciences]

[Abstract] MNOS [metal nitride oxide silicon] memory transistors are checked in a newly developed instrument which permits the measurement of up to 28 devices. Each sample is fed for 100 milliseconds the adjustable source-drain voltage and after a brief delay the gate-substrate voltage. The latter controls the 0 V gate-source voltage to a level where the source-drain current, set with a potentiometer, flows through the transistor. There is also a sampling circuit, and the gate-substrate voltage is converted into digital form for processing in the peripheral unit. A digital display shows the position of the sample being measured. The processed data provide information on the charge-storage capacity of the MNOS memory devices. The method enables quality control and can also help in designing devices which are optimized for various use characteristics such as write and erase potential or reprogrammability. The measured data are processed with an EMG [Electronic Measuring Instruments Factory] 666 minicomputer. Figures 4, references 8: 1 Hungarian and 7 Western.

2542
CSO: 2502/76

UDC: 681.325.5.049

PROBLEMS OF DEBUGGING MICROPROCESSORS

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 4, 1981 pp 121-125
manuscript received 14 Jan 81

DRIMUSZ, Laszlo (Microwave Communications Department, BME [Budapest Technical University]) and SZEKELY, Levente (BHG [Beloiannisz] Communications-Technology Enterprise)

[Abstract] A simple and a more complex microprocessor debugging system were described. The simpler system, developed at the Microwave Communications Department of BME, optimized for the 8080 microprocessor and operating on the basis of the "Wait" principle, examines the data and the address buses bit for bit, and identifies major hardware defects, short circuits, and wrong or missing connections. The more complex system, also developed at BME, is optimized for the Z80 microprocessor. It has the following capabilities: execution command for command and cycle for cycle, address stop, data stop, relation (and/or) between two preceding units, cycle stop and display or startability by display, oscilloscope, or logical analyzer, possibility of DMA, direct port access, insertion, cyclic insertion, time-sharing options, drawing a memory map, and acoustical indication. To accomplish all these tasks, it has bus drivers, high-impedance memories and memory drivers (deselect trigger), high-impedance control of points and peripheral units, interrupt deselect, automatic dynamic memory refreshment, and integrated DMA controller. Figures 7, references 5: 1 German and 4 Western.

2542
CSO: 2502/72

MICROPROCESSOR AND SMALL-COMPUTER CONTROL OF NUMERICALLY CONTROLLED TECHNOLOGICAL EQUIPMENT

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 3, Mar 81 pp 82-87

BANLAKI, Pal, scientific scholarship holder, Department of Electronic Technology, BME [Budapest Technical University]

[Abstract] The author discusses the characteristics of numerically controlled technological equipment, regarded as a component of a data-processing system, with special emphasis on the possibility of implementing microprocessor and small-computer control. A system made up of the ADMAP-2 drawing automaton and the F8 microprocessor is described as a specific example. This system demonstrates that microprocessor control is feasible and that it contributes to more reliable and faster operation. The following features are available: digitalization (following the drawing with a joystick control and storage of the drawing data in the memory), digitalization for defining a recallable configuration, digitalization plus configuration drawing, drawing on the basis of data stored in the memory, transfer of the stored drawing data onto perforated tape in a compact form, reading-in of the compact perforated card (together with drawing if so desired), reading-in of conventional perforated tape (together with drawing if so desired), and character generation. For all these features, a memory capacity of 16K RAM is required, based on up to 2000 configurations on a dual ESER card. The program memory is 3K, with an additional 1K being required for the storage of drawing configurations. The most important advantage of microprocessor and small-computer control is that it increases the intelligence level of the drawing machine. First operating experiences with the ADMAP-2/F8 system are favorable. Figures 3, references 6: 1 German, 3 Hungarian, and 2 Western.

2542
CSO: 2502/77

MODELING OF MICROPROCESSOR SYSTEMS WITH COMPUTER

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 4, Apr 81 pp 125-127

GIZDONY, H.; KVECENY, A.; and PAVLJAK, A., Silesian Technical University,
Department of Electronics, Glivice, Poland

[Abstract] Typical problems of the modeling of microprocessor systems, such as hierarchic modeling (modeling of algorithms, operators, and components at their respective levels), dynamic memories, and tri-state bidirectional buses, are discussed. The SYMP simulator is the modeling program of the INTEL 8080 microprocessor at the operator level. The modeler's commands are entered via punched card. The commands enable the monitoring of the program run (content of the microprocessor's registers, various sectors of the ROM and RAM memories, and the execution time of the program). By altering the content of the appropriate memory cell, program faults can be corrected. The corrected final program is entered in the hexadecimal system via perforated tape. The primary goal of the simulator is the logical checking of the algorithm of the user program. The SYMP program is written in the PLAN language; it requires approximately seven words capacity, not including the dynamically occupied sectors in the simulated ROM/RAM memories. Operating experiences with the program are favorable. Figures 3, table 1, references 6: 1 Russian and 5 Western.

2542
CSO: 2502/71

PARTICIPATION OF HUNGARY IN THE DEVELOPMENT OF THE INTERKOZMOS SATELLITE DATA ACQUISITION SYSTEM AND THE MICROPROCESSOR-BASED CONTROL UNIT OF THE SYSTEM

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 2, Feb 81 pp 41-47

Dr HETENYI, Tamas, BME-MHT [Budapest Technical University - Microwave Communications Engineering Department], Space-Research Group

[Abstract] This article describes the design, construction, operation, and performance of the SSPI data-acquisition system aboard the Interkozmos-20 satellite, which was launched in November 1979, and of the KMA-M microprocessor-based unit performing the complex control of the system. The SSPI system uses analog, digital, and continuous acquisition elements. The measured data are stored in bays, of which the content is transmitted to the ground upon demand or according to a predetermined schedule. The control unit (of which the microprocessor test program and many interfaces were developed and made in Hungary) tests the satellite electronically, the bays electronically, the system according to a complex schedule, and causes self tests to be carried out. Prelaunch tests include laboratory tests, technological tests, and radio tests. Test programs are available for the various tests. The major components and programs are briefly reviewed. Figures 11, no references.

2542
CSO: 2502/74

ELECTRICAL ENGINEERING - SPACE HUNGARY

SOME DESIGN ASPECTS OF THE BALATON ON-BOARD PSYCHOPHYSICAL ANALYZER

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 2, Feb 81 pp 48-51

KASA, Zoltan, and HIROS, Laszlo, Medicor Works

[Abstract] The instrument determines the information-processing capability of the spacecraft crew during flight by means of a quadruple-choice test; it operates in a self-contained manner, transmits the results to the ground, permits self-testing by the crew, is basically a research unit, and bases the findings on the measurement of pulse count, galvanic skin reflex, and other parameters with biological feedback. The instrument can withstand the rigors of the launching, does not contaminate the spacecraft atmosphere, is electrically safe, operates from its own battery or from the spacecraft power supply, and works dependably under conditions of weightlessness. Its major components are the power-supply unit, the reaction-testing channel, the pulse-count measuring channel, the channel measuring the galvanic skin reflex, and the electronic control unit. Properly designed housing and a launch protector insure sturdiness. The unit was extensively tested for vibration resistance, impact resistance, and ability to withstand various environments. The instrument performed well in test launches, and is now part of the on-board equipment of Salyut-6. Work is in progress on improving the analysis of the results and on adapting the instrument for medical (primarily occupational-safety) applications. Figures 6, no references.

2542
CSO: 2502/74

DESIGN ASPECTS AND ENGINEERING CHARACTERISTICS OF THE "DIAGNOSZT" INSTRUMENT

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 2, Feb 81 pp 52-54

KISS, Miklos, department head, Dr JUHASZ, Andras, group leader, BERKES, Jozsef, engineering developer, and KOVACS, Attila, engineering developer, Medicor Works

[Abstract] The Diagnost instrument, developed at Medicor Works for space-medical uses and now also series-produced, measures the parameters characterizing the status of the heart, the blood-circulation system, the respiratory system, the senses, and the nervous system, and is also suitable for autogenous training with the aim of relaxation (the latter made possible by the use of biological feedback). The instrument simultaneously plots the ECG, counts the pulse rate, and measures the systolic and diastolic blood pressure. Three respiratory parameters are measured, response reactions to auditory and light stimuli of various intensities are measured, and pushbutton operation activates the alpha activity of the brain. The diagnostic unit consists of the measuring unit and the accessory pack. All measurements and autogenous training steps are recorded and remain available for subsequent reevaluation. While the instrument, aimed at providing "instant diagnosis," was originally developed for the Hungarian cosmonaut, it has potential for use in general medical practice. Studies are underway to adapt it for such uses. Figures 3, no references.

2542
CSO: 2502/74

ELECTRICAL ENGINEERING - SPACE HUNGARY

APPLICATIONS OF THE TLD-04B THERMOLUMINESCENCE DOSIMETER

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 2, Feb 81 pp 55-60

VAGVOLGYI, Jeno, and SZABO, Peter Pal, Central Physics Research Institute, MTA [Hungarian Academy of Sciences], Budapest

[Abstract] The TLD-04B was originally developed for space use; however, it has potential for other uses as well. The Central Physics Research Institute now series-produces it. The instrument may be used for routine dosimetry, and permits the evaluation of a broad range of thermoluminescence dosimeters at a high degree of accuracy. The authors describe the space uses of the instrument, and discuss some other potential applications such as personal dosimetry (for staff in research institutions, nuclear facilities, and so forth), medicine (checking diagnostic and therapeutic radiation), environmental protection (measuring the ambient dose rate), dating (for example of archeological specimens), and so forth. A comprehensive study was made to compare the performance of the TLD-04B with commercially available domestic and foreign-made dosimeters. The findings indicated that the new instrument is more accurate and reliable than most. It is therefore recommended to extend the use of the instrument and explore possible additional applications. Figures 8, references 6: 2 Western, 1 Russian, and 5 Hungarian.

2542
CSO: 2502/74

ELECTRICAL ENGINEERING - SPACE HUNGARY

EQUIPMENT OF THE "INTERFERON" EXPERIMENT

Budapest FINOMMECHANIKA MIKROTECHNIKA in Hungarian Vol 20, No 2, Feb 81 pp 61-63

HIROS, Laszlo, Medicor Works

[Abstract] The equipment for the INTERFERON space experiment is used to enable the Hungarian cosmonaut to forward the test specimens to the space station whence it is forwarded to the ground. Various human interferon preparations are accommodated in the unit in the form of lyophilized powder, liquid, or paste. The box is stowed in the passenger space of the spacecraft during the voyage. After the end of the mission, the contents are evaluated in Budapest at the virus laboratory of the Microbiological Research Group of the Hungarian Academy of Sciences. The primary purpose is to obtain information concerning the effects of spaceflight on the interferon production of the human white blood cells. The leucocytes are obtained in sealed test tubes, 10 test tubes are carried, and each test tube can be individually manipulated without the need for removing it. The inducing fluid is added whenever the conditions are appropriate for this. The unit can be sterilized and is made of inert material. The equipment was checked in the USSR before launch. It had to withstand rigorous vibration, impact, acceleration, drop, and seal test exposures. Various modifications were made on the test tubes and other equipment obtained to make it suitable for the intended purpose. Figures 2, no references.

2542
CSO: 2502/74

UDC: 621.3.049.75.08:681.2:62-52

INSPECTION OF UNASSEMBLED CIRCUIT BOARDS WITH AUTOMATIC MEASURING EQUIPMENT

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 3, 1981 pp 100-106
manuscript received 15 Feb 79

KAS, Ivan, MTA SZTAKI [Hungarian Academy of Sciences, Computer Technology and Automation Research Institute]

[Abstract] Unassembled circuit boards, which are ready for the installation of the components, need to be inspected to establish whether the mounting facilities are of proper dimension and layout for the components and whether the conductor paths are as required, without short circuits and/or interruptions. For designing a suitable automatic inspection instrument, the wiring and layout must be first accurately described. Then, the kind (resistance, conductivity), sequence, and schedule of the tests must be established. Finally, limit values must be established which, when exceeded, trigger an alarm and the rejection of the circuit board being inspected. To develop a versatile system, the author examined the following already existing measuring instruments: LM-ELECTRONIC (FRG) LP 500-2030 (inspecting instrument for two-sided circuit boards), ERSA (FRG) WEE 21 (using spring-loaded contacts), MANIA (FRG) MPP 3000 (to inspect back-surface wirings), OK MACHINE AND TOOL CORPORATION (USA) WA2k, WA4k, and WA65k (high-speed, solid-state instruments, also suitable for inspecting cable harnesses), TERADYNE (USA) N 151 (suitable for inspecting large-scale back wirings and cable harnesses), and DIT MCO (USA) SYSTEM 823 (suitable for inspecting computer-generated wirings). The major parameters of the examined systems are presented in tabular form. All feature solid-state circuitry and special or universal high-speed contacts. Computer or microprocessor control is generally used, and the manufacturers usually also supply the required software. The use of such equipment increases productivity and improves product quality. Figures 3, table 1, references 13: 3 German, 6 Hungarian, and 4 Western.

2542
CSO: 2502/73

UDC: 536.53:621.36.012

METROLOGICAL EXAMINATION AND EVALUATION OF OPERATIONAL THERMOCOUPLES

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 1981 pp 30-37

KISS, Bela, Hungarian Electrical Engineering Inspection Institute

[Abstract] Operational thermocouples are used mostly as thermostats in industrial and residential applications. The author describes the electrical circuits, materials, and displays of these units and discusses the various national and international standards governing their performance characteristics. Measurements were carried out on a large number of copper/constantan, iron/constantan, nickel-chromium/nickel, and other thermocouples made domestically and some other countries (FRG and USA). These measurements were carried out according to the most recently introduced or amended standards (MSZ [Hungarian standards], DIN [FRG standards], IEC standards, and CEMA standards). The results of the measurements, involving a total of 13 thermocouples, were presented in diagrams and tabulated form. Valuable information was obtained concerning the random and systematic errors of the various types. The information could be used in designing better thermocouples, so that the energy and other economies resulting from the use of thermostats could be maximized. Figures 6, references 10: 3 Hungarian, 3 German, and 4 Western.

2542
CSO: 2502/75

THERMOGRAPHY HUNGARY

UDC: 536.5:621.397:535-1

INFORMATION CONTENT AND IDENTIFICATION OF INFRARED PICTURES

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 1981 pp 2-8

Dr BENKO, Imre, Thermal and System-Engineering Institute, BME [Budapest Technical University]

[Abstract] The author presents a general review of infrared pictures, which are used to evaluate the temperature distribution of various objects, with special emphasis on the information content of the pictures and the proper methods for evaluating the information content. The full range of uses of thermography has still not unfolded. The simplest thermographs represent the effective radiation (own and reflected) of the object; they are largely useful only for shape recognition. The FLIR infrathermograph is one such instrument. The thermograms are infrared pictures which represent the object's own radiation only. Qualitative thermograms permit observation, comparison, and diagnosis; quantitative thermograms permit surface temperature distribution analysis. Thermotopograms represent the surface luminance distribution of the object, resulting from the object's topography; they may be tonal pictures or pictures made up of isodensity curves and isochromatic curves. In evaluating the thermographic pictures, we need to have a better understanding of the emission properties. In this, useful assistance can be had from the use of temperature-radiation standards. The angle of observation is also an important parameter in the evaluation. Equipment is now available for the examination of the infrared pictures and topograms of spherical and cylindrical surfaces of isothermal and homogeneous blackness character. Obviously, there is not necessarily a shape similarity between the photograph and the thermal picture of an object. Further studies, such as the determination of the blackness of various substances and the determination of the topographic effects, are still needed to permit full use to be made of the infrared pictures. Figures 13, references 5: 1 Western and 4 Hungarian.

2542
CSO: 2502/75

THERMOGRAPHY HUNGARY

UDC: 621.397:535-1

IMAGING IN THE INFRARED RANGE

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 1981 pp 9-13

FALUDI, Arpad, Thermal and System-Engineering Institute, BME [Budapest Technical University]

[Abstract] The infrared-television equipment has the following major parts: radiation detector, optical system, scanning unit, electronic signal converter, imaging unit, and temperature-reference unit. These components are briefly and generally described. Many accessories, such as grey filters, corrective filters, planar mirrors, external-temperature standards, stroboscopes, and signal-to-noise ratio improvers, are also used. The aim of this brief general review is to enable the users of thermographic images in reducing errors in operation and evaluation. Most such errors arise in the camera and its relationship to the object being examined, and in the infratelevision system itself. Optimum use of the method can be obtained only if the operator is fully conversant with their operation and capabilities. Figures 5, references 5: 1 Polish and 4 Hungarian.

2542
CSO: 2502/75

UDC: 621.397.08:535-1:551.51

EFFECT OF THE ATMOSPHERE ON INFRATELEVISION MEASUREMENTS

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 198[illegible] pp 14-17

KONCZOL, Sandor, Department of Caloric Machines, BME [Budapest Technical University]

[Abstract] In order to permit the optical properties of the atmosphere between the object examined over a long distance by infratelevision and the camera to be properly considered in the qualitative and quantitative evaluation of the thermograms, the authors examined the reduced thermal radiation impinging on the InSb sensor of the measuring system under various meteorological conditions and from various distances. Distance and the spectral transmission characteristics of the atmosphere had the greatest effect. A method was described for the calculation of the reduced sensitivity of the InSb detector (which is operated at -78°C). It was found that the reduced thermal radiation impinging on the object is attenuated as a function of the thickness of the air layer and that the value of the reduced sensitivity changes at a constant distance depending on the temperature of the object. In case of a surface object temperature of 150°C thermographed from a 10 m distance with an AGA 680(f)1,8 instrument, the thermogram can be evaluated with an error of -25°C, using an adjacent reference radiation source. Major improvement in accuracy can be achieved by placing the reference source at the same distance from the camera as the object. Based on the above findings, means for improving the calibration procedure were developed. Other factors affecting the accuracy of the measurements are the carbon dioxide and water-vapor content of the atmosphere (they contribute to radiation attenuation and, to a lesser extent, have a temperature-related radiation emission themselves). Figures 3, table 1, references 5: 1 Hungarian, 1 Western, and 3 Russian.

2542
CSO: 2502/75

THERMOGRAPHY HUNGARY

UDC: 535.211:536.5

THERMOGRAMS OF TRANSPARENT MEDIA AND THEIR EVALUATION

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 1981 pp 18-25

KISS, Laszlo, Institute of Thermal and System Engineering, Budapest Technical University

[Abstract] The various optical methods available for the thermographic determination of transparent flowing media (such as water and air, used in heat-transfer systems) were reviewed. The relationship between the refraction index and temperature, the determination of the distribution of the refraction index, and the heat-engineering applications of the Schlieren method were discussed. Thermograms taken with a modified Zeiss-80 instrument at the author's institute were presented and discussed. The major steps in the evaluation of the thermograms involve the determination of the distribution of the refraction index from measuring the distortion of the wave surface, and the determination of the temperature distribution from the distribution of the refraction index. Best results with transparent media can be obtained by combining several methods, such as shadow methods, Schlieren methods, and interferometric methods. Wave distortion can also be measured by various methods (such as angle deflection and phase difference). Figures 23, references 10: 3 Russian, 1 Hungarian, and 6 Western.

2542
CSO: 2502/75

UDC: 536.33.089.6:621.397.088.535-1

CHARACTERISTICS OF TEMPERATURE REFERENCE RADIATION SOURCES

Budapest MERES ES AUTOMATIKA in Hungarian Vol 29, No 1, 1981 pp 26-29

KARNER, Miklos, National Metrology Bureau

[Abstract] The methods for the calculation and the measurement of the emission factor of temperature reference radiation sources were described and the usefulness of using the ambient thermometer as a temperature reference radiation source was examined. The background radiation is often used in infratelevision measurements. The temperature of the ambient environment can be determined by means of radiation measurements. A simple ambient thermometer combined with radiation measurement was described. Basically, it is a hollow sphere having black interior surface with a thermometer inside and a single aperture. A density difference is measured and its temperature-dependence is evaluated with a calibration curve. The ambient thermometer is thermographed together with the object; its aperture serves as the reference source. The method is quite simple; however, it is not recommended if there is a major density or temperature difference between the reference source and the object. In this case one would have to reduce the sensitivity of thermovision, which reduces the accuracy of the temperature measurement. Figures 3, references 6: 3 Hungarian, 1 Czechoslovak, and 2 Western.

2542
CSO: 2502/75

SATELLITE NAVIGATION, SPACE RESEARCH PROGRAM OUTLINED

Warsaw PRZEGLAD MORSKI in Polish No 3, Mar 81 pp 23-29

[Article by Docent Dr Jan Wereszczynski: "Expansion of Satellite Navigation Research During the 1980-1985 Period Within the Framework of Space Research"]

[Excerpt] In accordance with the decision of the president of the Council of Ministers, the Polish Academy of Sciences [PAN] Committee on Space Research initiated preparatory work on the comprehensive problem "The Expansion and Applications of Space Research in early 1979. "Work on realizing this problem, begun in January 1980, should be completed by the end of 1985. The primary goals of the problem are contained in the document "Space Research Expansion Trends and Applications During the 1979-1985 Period and Beyond," which was drafted in October 1978 and adopted by the PAN Presidium in January 1979. The goals are also based on the guidelines of the INTERKOSMOS socialist countries cooperation program and the past results of the interministerial problem. The navigation problem contained in this document was presented on the basis of the paper presented by Lodz Polytechnic; "Satellite Navigation in Light of Human Activity on the Seas and in the Air."

In accordance with the initial guidelines, all space research in Poland and space-technology applications in various sectors of its economy are included in the conceived comprehensive problem. The problem divisions and their coordinating units were initially established as follows:

1. Physics of space--the PAN Space Research Center;
2. Satellite geodesy--the PAN Space Research Center;
3. Materials technology in space--the PAN Institute of Physics;
4. Remote sensing--the Institute of Geodesy and Cartography;
5. Space communications--the Institute of Communications;
6. Space meteorology--the Institute of Meteorology and Maritime Economy;
7. Space medicine and biology--the Military Institute of Aviation Medicine;
8. Manned space flights--the PAN Committee on Space Research;
9. Social problems of space research.

The problem is being coordinated by the Pan Space Research Center under the sponsorship of the PAN Committee on Space Research.

In May 1979, the PAN Committee on Space Research approached selected scientific centers in which navigation is studied, including all the higher schools, with the proposition that they participate in the comprehensive problem "The Expansion and Applications of Space Research." A seminar was held on 4 July 1979 to evaluate the announced proposition; it was attended by members of the coordinating group and specialists. The scientific centers interested in expanding research in navigation were represented at this seminar by Commodore (Dr) M. Holec of the WSMW [Higher Naval School], Col (Engineer) M. Wojewodski of the WOSL [Higher Air Force Officers School], Docent (Engineer) J. Kabacinski of the WSM [Higher Maritime School ?] Szczecin, Docent (Doctor, Engineer) J. Wieland of the WSM Gdynia and Docent (Engineer) J. Wereszczynski of Lodz Poytechnic. As a result of this discussion, it was resolved that the PAN Space Research Center would define the problem more precisely and send it to the interested institutions.

Trends of Expanded Research on the Area of Satellite Navigation During the 1980-1985 Period

Satellite navigation research has been incorporated into the satellite geodesy theme by the PAN Committee on Space Research. In the 1980s, the research themes in this area should focus on the following problems:

1. Investigation of Geodynamic Phenomena. Work should be conducted on the circular movement of Earth, on the movements of tectonic plates and on Earth tides. This work, which uses satellite technology, should continue to be supplemented with standard astronomical and geophysical observations, which over the next few years will continue to play an important role in researching long-term and ancient phenomena. The use of Doppler and laser satellite techniques will be the most useful techniques for researching geodynamic phenomena. These types of observations, which use stationary instruments, should be made at the Borowiec station according to a comprehensive and multilateral program. It also would be desirable to make stationary observations at a second point in Poland. For example, it could be at the observatory in Jozefoslaw, which is actively participating in the work of the Earth Axis Movements Service. Conducting Doppler and astronomical observations at these two points would permit tracking the accuracy of referencing Doppler observations to the mean configuration of the Earth as well as conducting other geodynamic research. The investigations are also of significance to the work described in point 3.

For geodynamic research using satellite methods, complete results can be obtained only if the work is conducted on an international level.

2. Gravitation Field Research. During the next 5-year period work should concentrate on the problem of improving the model of the Earth's gravitational field, on local demarcations of gravitational field parameters, and on methods of computing SSZ [artificial earth satellite] orbits.

Additional theoretical work should be done on the methodology of geopotential research as well as on obtaining information on geopotentials using various observational satellite techniques. These investigations will provide the theoretical bases for designing new space experiments in this area. In particular, realizing the gravimetric anomaly measurement project (the DIDEX project) using satellite Doppler observations in an important task in this area.

Regardless of their cognitive value, these investigations are of vital practical significance. For example, they are essential in identifying the Earth's natural resources and for arranging geodetic systems for large areas.

3. Using Satellite Observation Techniques in Applied Geodesy. In the framework of this problem, work should start immediately to create in Poland an experimental Doppler system. However, it should be remembered that research in Doppler techniques is very advanced in the world and therefore observations should be undertaken right away using readymade (purchased) equipment of the best engineering parameters in such numbers as to permit observations via the translocation method. A Polish experimental Doppler system would permit apparatus research and testing, work on the problem of the scope of this system, and the practical realization of research on incorporating Doppler observations into the astronomical-geodetic system.

Independent of the Doppler observations, ongoing observations made by the laser and photographic methods should be used in this system, which would be of vital significance in researching the scale and orientation of the Doppler system. In addition, observations made via the continental satellite system should be continued. Observations via this system are coordinated within the framework of INTERKOSMOS cooperation and bilateral agreements. The results of this research will have an important effect on shaping future technologies for arranging very accurate basic geodetic systems. The practical applications of this research for export work should also be remembered because the work would be done by the Polish Geodetic Service, and because it would make it possible to improve the basic accuracy of Poland's geodetic network.

4. Investigating the Upper Layers of the Atmosphere. These investigations via satellite techniques should be linked with improving low-ceiling satellite observation techniques. Theoretical investigations to create a dynamic model of the atmosphere will also be necessary. These investigations will also be very significant when compiling observations made via third-generation laser range finders. They can also serve to investigate various space phenomena by analyzing the correlative connections between these phenomena and changes in the parameters of the atmosphere.

5. Navigation Using Satellite Techniques. Within the framework of work concerning satellite navigation, research should be conducted on how to better use existing navigation systems and how to develop our own equipment. In addition to investigating the accuracy of referencing the position of various types of navigation equipment, work should be done on the mutual transformation of coordinate systems; conversion from Transit coordinate systems to a marine-map coordinate system is especially important.

6. Development of Measuring Techniques; Equipment Research. In addition to the theoretical work which permits new space experiments to be prepared, the development of measurement technology is an equally important source of progress in the realm of satellite geodesy. To accomplish the above-described research we will have to purchase equipment and develop our own designs in this area.

Currently work is being done on a second-generation laser range finder and a Doppler receiver-measuring system.

Work should also continue on these projects during the next 5-year period. The construction of a prototype Doppler receiver was projected for 1979; further work must be done on its improvement. Work on building measuring equipment for the DIDEX experiment should be continued. It also should be emphasized that improved satellite geodesy measuring methods are closely linked with time and frequency metrology. Present research in these areas should continue during the next 5-year period.

For the most part the above problems are included in the catalog of problems of the Working Group on Space Physics, working within the framework of the INTERKOSMOS agreement. The KAPG and the geodetic services of the socialist countries are also interested in their solutions.

In summary, it should be emphasized that many of the above-presented problems can also be researched via standard methods. At the present moment space and standard methods should not be treated separately. It is possible to obtain fully valuable results only if both methods are used in a complementary fashion.

Independent of activity designed to better apply and understand existing satellite geodesy methods, studies of future methods should be conducted. The basic material for this article is based on questionnaires that were sent to all the institutions involved in the satellite geodesy problem or applying its results. In principle, all postulates gathered from the questionnaires are included in this article.

Source Material

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2. Stansell, T., "The Navy Navigation System: Description and Status," NAVIGATION, 15, No 3, 1968; "Using the Navy Navigation Satellite System," NAVIGATION, 17, No 2, 1970.

3. Urbanski, J., "Accurate Navigation Requirements for Human Activity on the Sea," Symposium of the WSMW Institute of Navigation and Hydrographics, Gdynia, 1976.

4. Wereszczynski, J., "Satellite Navigation in Light of Human Activity on the Seas and in the Air," POSTEPY ASTRONAUTYKI, No 1, 1980, 13; "Investigations of the Accuracy of Demarching Positions in Marine Navigation Using Satellite Techniques," Lodz, Lodz Polytechnic, 5 May 1979, unpublished paper.

5. PAN Space Research Center (document): "Development Trends and Applications of Space Research in Poland During the 1979-1985 Period," Warsaw, October 1978; "Information on Thematic Conferences on Selected Space Research Activities and Possibilities of Applications;" "List of Themes To Be Realized During the 1981-1985 Period in the Area of Satellite Geodesy Within the Framework of the Comprehensive Problem 'The Development and Application of Space Research.'"

6. The PAN Committee on Space Research: "Development Trends in Research in the Area of Satellite Geodesy in Poland During the 1981-1985 Period."

7. Walczak, A., "The Investigation and Comparison of Different Types of Satellite Receivers," WSM Szczecin, 15 June 1979, unpublished paper.

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CSO: 2602/14

NUCLEAR SAFETY NORMS MODIFIED IN OFFICIAL ORDER

Bucharest BULETINUL OFICIAL in Romanian Part I, No 29, 20 Apr 81 p 4

[Order of the State Committee for Nuclear Energy on the Modification of Provisions in the National Norms on Nuclear Safety in Handling Sources of Nuclear Radiation]

[Text] The chairman of the State Committee for Nuclear Energy, having in mind the provisions of Article 47 of Law No 61/1974 on activities in the nuclear sphere in the Socialist Republic of Romania, on the basis of Council of State Decree No 85/1979 on the organization and operation of the State Committee for Nuclear Energy issues the following order:

Article 1. The national norms on nuclear safety in handling sources of nuclear radiation, approved by Order No 133 of 8 April 1976, published in BULETINUL OFICIAL Part I, No 31 of 16 April 1976, are modified in accordance with the annex[1] which is an integral part of the present order.

Article 2. The modifications specified in the present order go into effect beginning 30 April 1981.

Article 3. The State Inspectorate for the Control of Nuclear Activities and for the Assurance of Nuclear Quality, the Economic Directorate, and the Institute for Nuclear Engineering and Physics will carry out the provisions of the present order.

[Footnote] 1) The Annex is being transmitted to the institutions concerned through the good offices of the State Committee for Nuclear Energy.

Chairman of the State Committee for Nuclear Energy, Cornel Mihulecea

Bucharest, 16 March 1981
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